

State of California

Business, Transportation and Housing Agency

# Memorandum

**To :** Mike Powers; Project Manager  
District 11 Traffic project Development  
Mail Station: MS-34

**Date:** June 16, 2004  
**File :** 11-SD-78  
PM 20.7/R21.3  
KP 33.33/R34.27  
11-241901

**Attention :** Danny Tran; Project Engineer  
District 11 Traffic project Development

**From :** **DEPARTMENT OF TRANSPORTATION**  
**Engineering Service Center - Office of Materials and Foundations**  
**Roadway Geotechnical Engineering – South (MS #63)**

**Subject :** GEOTECHNICAL ENGINEERING INFORMATION FOR THE PROJECT OF WIDENING AND FACILITY ENHANCEMENTS ALONG SR-78.

## INTRODUCTION

Per your request, we are providing the following information regarding geotechnical engineering conditions anticipated to be encountered during the construction of the proposed project.

We understand that the proposed project is constrained to the existing State right-of-way (ROW). The proposed project will widen the existing facility on both sides of State Route 78 (SR-78) between Citrus Ave. and Flora Vista. It will also provide a left turn channel at Summit Dr. and sidewalk construction. Additionally, the project will replace the existing open concrete channel (located along the south side of SR-78 between Summit Dr. and Sorrentino Dr.) with a 1200 mm Reinforced Concrete Pipe (RCP). To facilitate widening, retaining walls will be constructed along intervals of both the north and the south side of SR-78 between Citrus Ave. and Summit Dr.

The proposed project includes constructing new cut-slopes, altering existing cut-slopes, the construction of new embankment, and retaining walls, the demolition of existing drainage structures, and the construction of new drainage structures.

## DISCUSSION

The proposed project lies entirely within unincorporated Escondido a community of San Diego County. The project is located within the moderately to densely developed suburban fringe located just east of the City of Escondido. Here, single-family homes, schools, small parcels of undeveloped land, small businesses, and small groves and orchards abut the project corridor.

The project is located within the interior upland physiomorphic province, which is comprised of steep-sided hills, canyons and intermediate valleys. Topographically, the area is comprised of low dome shaped hills with intervening arroyos and canyons. The project corridor is located partially within a small arroyo formed within a ridgeline that separates the Escondido basin from the San Pasqual Valley.

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Existing cut slope ratios vary with location and material; they range from 1:5 to near vertical.

Throughout the project corridor, embankment slopes and existing cuts are in good condition; however, some zones of excessive erosion and shallow slips were observed. Construction will entail temporary slope stability issues that may require temporary construction shoring.

Subsurface materials were evaluated by limited soil borings, rock coring operations, outcrop mapping, seismic refraction surveys, soil probes, and potholes. Bore holes were developed by use of trailer mounted Mobile B-47 Drill Rigs and by portable Minute-Man Drill equipment. Please refer to the Logs of Test Borings for a description of the materials encountered at boring locations. Please contact the San Diego office of the Department of Transportation (District 11) to review seismic refraction data.

#### **SITE GEOLOGY**

This area lies entirely within the Peninsular Range Geomorphic Province, one of the 11 provinces that comprise California. The area exposes relatively few lithologic units; however, those present may exhibit a very broad range of properties. Weber (1958-1959) and O. P. Jenkins (1962) and numerous other investigators have mapped the area geology. Generally Mesozoic igneous intrusive (granitic) bodies of the Peninsular Batholith underlie the area. These rocks are mantled by materials derived from the in-place weathering and decomposition of the parent rock (generally known as residuum, regolith, grus, or decomposed granite) and by alluvial and colluvial deposits and by engineered and non-engineered fills.

The following Lithologic units are present in the vicinity of the proposed project.

##### Artificial Fills:

Fills created by the activities of man derived from locally occurring materials (soils and rock) placed either in accordance with accepted engineering practice (engineered fills) or without regard to engineering standards and practices (non-engineered or undocumented fills). Grain sizes range from clay sized particles to boulder sized clasts. Fill density ranges with location depth from very loose to dense and soft to very stiff.

##### Alluvial Deposits:

Clay, silt, sand, gravel, and boulder deposits. Some deposits are organic rich.

##### Colluvial Deposits

Clays, silts, sands, gravel, and boulder deposits transported by gravity flow and slope wash.

Very Intensely Weathered Cretaceous Granitic, Gabbroic Rocks - Undifferentiated (decomposed granite- D.G.)

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Grade IA, IB, IC (after Deere and Patton 1971) residual soils and saprolites derived from the in-place decomposition of the intrusive rocks. Decomposition products include clays, silts, sands, gravels, and boulders. Some may retain residual rock fabric that disaggregates easily. These materials are essentially soils that are highly susceptible to erosion.

Cretaceous Granitic and Gabbroic Rocks - undifferentiated

Type IIA, IIB, and type III (after Deere and Patton 1971) intrusive igneous rocks of varying chemistry. Rock quality varies with degree of fracturing and weathering. Outcrop characteristics vary drastically from location to location. Outcrops will vary from moderately hard weathered rock to very hard fresh rock. Texture may vary from residual core stones in a decomposed matrix where the rock component is dominant to massive crystalline rock bodies. Outcrops may vary from very intensely fractured to non-fractured. Some outcrops may show foliation and gneissic textures due to contact metamorphism. Chemistries include granite, granodiorite, quartz diorite, gabbros, and other mafic bodies. Rock texture can vary from aphanitic to pegmatitic.

**GROUNDWATER**

Groundwater was not observed in the borings; however, portions of the project corridor cross and/or follow localized natural drainage courses; therefore, groundwater may be a project concern. Two of which were observed to contain water during the field investigation. This indicates that seasonally fluctuating perched groundwater should be anticipated in the soil deposits (fill, alluvium, regolith) adjacent to and along project corridor subintervals near the ephemeral stream courses. Subsurface materials include rock and relatively impervious soils overlain by pervious soils. De-watering may be required to facilitate construction of some of the proposed project features.

**RIPPABILITY - DRILLABILITY**

Rippability is defined as the ability of a bulldozer with a ripper hook to rip out rock. Both rippable and non-rippable materials are present within the proposed project; however, we anticipate that the majority of the material encountered during construction will be rippable by heavy construction equipment. Granitic boulders are likely to be encountered in excavation of both antecedent fills, in alluvial and colluvial deposits as well as in the residuum (weathered rock). Small granitic rock "ribs" or outcrops that require fragmentation to facilitate excavation are also likely to be encountered in cuts in natural outcrops.

Drillability refers to the ability to progress drilled shafts with standard construction drill rigs at efficient production rates. We anticipate that some boulders, cobbles, and gravels will be encountered during construction. Remnant (residual) or buried boulders of granitic rock will require specialized drilling equipment to advance holes.

Refraction seismic lines were developed over the proposed cut located left of centerline between station 34+00 and 36+00. Refraction seismic data is available to prospective bidders upon

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request. The data are part of the Open File Report stored at the Office of Roadway Geotechnical South II located at 7177 Opportunity Road, San Diego, Ca. Arrangements to review the open file report can be made by contacting the Office Senior, Brian Hinman, at 858-467-4051 or by contacting Jeff Kermode at 858-467-4062.

**COMPRESSIBLE AND EXPANSIVE SOILS**

Expansive soils were not identified within the project corridor. It is unlikely that significant quantities of expansive soil will be encountered.

Organic rich deposits may be encountered along the layout of the proposed RCP and at locations where the highway crosses existing drainages. However, we do not anticipate that a significant quantity of low bearing strength or compressible material will be encountered. Organic rich material not be incorporated into project embankments. These materials should either be exported off site or placed in landscaped areas.

**SLOPE STABILITY**

No significant slope failures were observed within the project corridor; however, there are several small slumps and slips in the interval right of centerline between station 33+80 and 35+20 centerline SR-78. At two locations, small headwalls and gunite/shotcrete panels appear to have become detached from the slope. These minor slope failures and the headwall and gunite panel must be addressed by the proposed project and will require that temporary slope stability conditions be evaluated. Conditions conducive to deep-seated slope failures were not observed within the project corridor; however, temporary slope stability must be evaluated both right and left of centerline between station 33+00 and 35+74.

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### EROSION

Erosion potential varies from highly susceptible to essentially non-erodible. The United States Department of Agriculture has classified the erosion potential of site soils as moderate to severe (refer to Table 2). Concentrated run-off must be directed away from cut faces. Site soils will require protection from rain and runoff.

Table 1: USDA Series Names, ratings and Map Index Numbers for soils mapped within the vicinity of the proposed project.

SERIES NAME	PERMEABILITY cm/min	Erodability
RaB-Ramona Sandy Loam 2-5% slopes	2.0-6.3	Severe 16----
RaC-Ramona Sandy Loam 5-9% slopes	2.0-6.3	Severe 16----
FaC-Fallbrook Sandy Loam 5-9% slopes	2.0-6.3	Severe 16----
FaE2-Fallbrook Sandy Loam 15-30% slopes	2.0-6.3	Severe 16----
RaD2-Ramona Sandy Loam 9-15% slopes	2.0-6.3	Severe 16----
VsE2-Vista Coarse Sandy Loam 9-15% slopes - eroded	2.0-6.3	Moderate 2—

### HAZARDOUS MATERIALS

No known hazardous materials occur along the proposed project corridor.

### UNDERGROUND UTILITIES

Both existing and abandoned underground utilities were encountered during our investigation. These include natural gas, sewer, and water lines, and underground cable and television lines. Abandoned pipelines were encountered along the northwest end of the project corridor. Abandoned pipes must be removed or filled in a fashion to preclude water from entering the pipe.

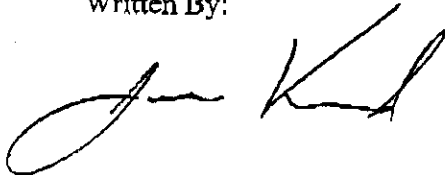
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If you require additional information please contact Brian Hinman at 467-4051 or Jeff Kermode at 467-4062.

Written By:



Jeff Kermode  
Associate Engineering Geologist  
Geotechnical Design South  
District 11

Reviewed By:



Zia Yazdani  
Associate Materials & Research Engineer  
Geotechnical Design South  
District 11

Cc:

Danny Tran	MS: 34
Abbas Abghari	MS: 5
RGES 01	
B. Hinman	MS: 63
Z Yazdani	MS: 63
J Kermode	MS: 63
FILES	





## TRANSMITTAL

Danny D. Tran  
Project Engineer  
California Dept. of Transportation- District 11  
P.O. Box 85406, M.S. 34  
San Diego, Calif. 92186-5406

PROJECT: Left turn channelization on Hwy. 78 at Summit Dr.

Dear Danny:

I am responding to your letter dated May 17<sup>th</sup>, 2004.

Potable water will be available for your contractor during the construction of the above referenced project. Your contractor will be required to apply for a construction water meter to be installed by City of Escondido forces near the construction site. A deposit of \$650.00 will have to be paid at the time of application, and the current water usage rate for this type arrangement is \$2.35 per 1000 gallons.

If you have any additional questions, please call me at (760) 839-4651 ext. 3866.

Sincerely,

Owen M. Tunnell, P.E., P.L.S.  
Civil Engineer II  
Design Section - Engineering Division  
201 N. Broadway  
Escondido, CA 92025